DOWN LOAD TYPE VIDEOTEX SYSTEM

Patent number: JP63237148
Publication date: 1988-10-03
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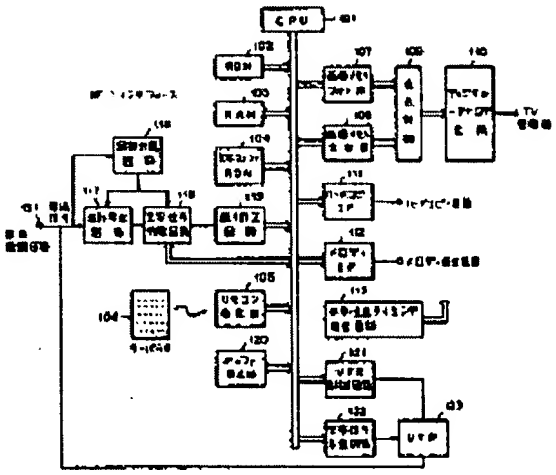
Classification:
- international: G06F13/00
- european:
Application number: JP19870072187 19870325
Priority number(s):

Abstract of **JP63237148**

PURPOSE:To offer a large data base at a communication cost lower than a videotex by multiplexing the accumulated data base all over the areas of a television signal and transmitting it to a VTR so as to record. CONSTITUTION:A terminal has a large scale buffer RAM 120 having two-face constitution and a VTR 123 with a searching function. The data base for videotex is broadcasted from an information center through a broadcast station and the terminal accumulates the received data base information in a buffer RAM 120 once and multiplexes the accumulated data base all over the areas of the television signal so as to transmit and record in a VTR 123. In case of retrieving the information, the searching of the VTR 123 is executed and the intended data base is loaded on the buffer RAM 120 in order to retrieve the desirable information.



Jpn. Pat. Appln. KOKAI Publication No. 63-237148

TITLE OF THE INVENTION

Download Type Videotex System

DETAILED DESCRIPTION OF THE INVENTION

[Field of Industrial Use]

The present invention relates a download type videotex system in a mode for downloading a database on a terminal and making a normal search while closing the database in the terminal, in which communication cost reduction and terminal price reduction are attempted.

[Prior Art]

A character multiplex broadcast system and a videotex system are present on the background of the present invention. First, a character multiplex broadcast is a system of multiplexing and sending out character and graphics information on a dummy scanning line of a vertical return line erasure period of a television signal, and an information provision mode includes a repetition type and a non-repetition type. The non-repetition type is employed for a telop relevant to a general program broadcast or news-flash like information provision. The repetition type is a system in which object information is picked up from among items of information repeatedly broadcasted based on information selected by a user, thereby apparently visualizing simple videotex.

A technical standard relating to a protocol (communication

rule) of a character multiplex broadcast is as shown in FIG. 4 (Journal of the Institute of Electronics Communication Information 1/87, P40). In the physical electrical characteristics of signals, a two-value NRZ signal having a bit rate of 5.7272 Mb/5.296 bit length is multiplexed on a dummy scanning line of a TV signal in a standard system at a level of 70%. In addition, four dummy scanning lines per return line erasure period are available. A repetition cycle in the case of the repetition type is about 20 seconds in view of a condition of a nominal response speed the user. In view of these facts, an amount of data which can be sent within 1 cycle is in order of 180 kB (bytes) at most including an error correction code, and only about 200 screens can be provided. That is, a conventional repetition type character multiplex broadcast has suffered from a disadvantage that a very small amount of information can be provided as compared with a videotex such as a captain.

There are a variety of videotex systems. There are three types of data syntax which is an international standard, and there are a plenty of types of network modes in which a database and a terminal are connected to each other. FIG. 5 shows one example of a videotex network mode, wherein reference numeral 100 denotes a videotex terminal, reference numeral 200 denotes an information center, and reference numeral 300 denotes a telephone network. The terminal 100 and the information center 200 are connected to the telephone network 300 via a subscriber line interface, whereas the information center has a plurality

of lines and is called by representative numbers. The telephone network merely provides a transparent connection bus.

FIG. 6 shows another example of a videotex network mode, wherein reference numeral 100 denotes a videotex terminal, reference numeral 200 denotes an information center, reference numeral 300 denotes a telephone network, and reference numeral 400 denotes a videotex communication processor device (VCP). The terminal 100 is connected to the telephone network 300 via the subscriber line network interface, the information center 200 is connected to the VCP400 via a leased line, the VCP400 is connected to the telephone network 300 via a relay line interface, and one VCP400 is connected to another by employing a leased line. An access from the terminal to the information center is provided via the telephone network and VCP by special numbers + center numbers.

FIG. 7 shows an exemplary configuration of a conventional videotex user terminal, wherein reference numeral 101 denotes a CPU, reference numeral 102 denotes a ROM for storing a program which works the CPU101, reference numeral 103 denotes a RAM required for an operation of the CPU101, reference numeral 104 denotes a character font ROM, reference numeral 105 denotes a remote controller photoreceptor part, reference numeral 106 denotes a keypad, reference numeral 107 denotes a photographic image memory, reference numeral 108 denotes a character image memory, reference numeral 109 denotes a display control part, reference numeral 110 denotes a digital analog conversion part, reference numeral 111 denotes a hard copy, reference numeral

112 denotes a melody interface, reference numeral 113 denotes horizontal and vertical timing generation circuits, reference numeral 114 denotes a modem interface, and reference numeral 115 denotes a modem.

In order to operate this terminal, first, the information center is called by using a telephone set, and a current terminal is switched to this terminal after line setting with the information center. Then, modem training is performed between the information center or VCP and the terminal, and an image signal receivable state is established. When an image signal is sent from the information center, the resultant signal is received and demodulated by means of the modem 115, and the received and demodulated signal is temporarily stored in a buffer provided in the RAM103 via the modem 114. Then, by means of the CPU101, ROM102, and RAM103, image signal conversion is performed based on a data syntax, and graphics information is stored in a photographic image memory 107. Character information is stored in the character image memory 108, the stored information is multiplexed at the display control part 109, the multiplexed information is converted to a TV signal by means of a digital and analog conversion part 110, and the converted TV signal is transmitted to TV receiving equipment.

At this time, the character font ROM104 is employed for conversion to a dot pattern of a character code, and horizontal and vertical timing generation circuits 113 are employed for conversion to a TV signal. A screen search request is inputted by the keypad 105, inputted request is transmitted to the remote

controller photoreceptor part 105 by means of an optical signal, the transmitted signal is converted to a predetermined format by working of the CPU101 or the like, and the converted signal is transmitted to the information center via the modem 115. The hard copy interface 111 is employed to output the contents of an image memory to a hard copy device, and the melody interface 112 is employed to output melody information contained in the reception information to a melody generation device.

In the case of the system shown in FIG. 5, if no special equipment is required on a network side and if the center and the terminal are in the same city, the communication cost is low. However, as the distance is longer, the communication cost is higher. In the case of the system shown in FIG. 6, a packet multiplex transmission is employed on a leased line, thereby making it possible to reduce the distance. However, leased facilities are required, and thus, the communication cost in city is higher than the case of FIG. 5. As described above, in the existing videotex system, although there is a difference in applicable region due to a distance, even in any of the systems shown in Figs. 5 and 6, a burden of the communication cost due to individual retention of communication lines cannot be avoided every time an information center access is provided. Thus, this system is disadvantageous in terms of the communication cost per user as compared with the character multiplex broadcast system if the number of users is increased.

The present invention has been made to solve these disadvantages. It is an object to provide a database which is

larger than that of the character multiplex broadcast system at a communication cost which is lower than that of the videotex.

[Means for Achieving the Objects]

According to the present invention, protocols having hierarchies 1 to 4 of a character multiplex broadcast system are employed. In addition, an apparatus having a two-face configured large capacity buffer RAM, a VTR with a initial setting function, and a videotex decoder is employed as a terminal. A videotex database is composed of one high order database and a plurality of low order databases. The high order database is configured so as to make a search for, and output sequence numbers of the low order databases. The low order databases each constitutes an integral videotex database and these databases are of size which can be stored in a buffer RAM of one face of each terminal. From the information center, the above videotex databases are broadcasted by employing the protocols having hierarchies 1 to 4 of the character multiplex broadcast via a broadcaster. At the terminal, after the received database information is temporarily stored in a buffer RAM, and one database is stored in the buffer RAM, a next database is stored in a buffer RAM having another face and the stored database is sent out and recorded in the VTR while the database is multiplexed in a full area of a television signal. When an information search is made, first, through a user's initial access, the high order database is loaded from the VTR onto the buffer RAM. Then this database is defined as one database, the sequential numbers of the target low order databases are searched

for, whereby VTR initial setting is performed, the target low order databases are loaded on the buffer RAM, and a desired information search is made.

As described above, in the present invention, a large amount of databases are sent out and recorded in the terminal VTR by utilizing the character multiplex broadcast system. Although a large amount of time is required for this purpose, there is no problem with the communication cost because a communication network is not occupied. A search is made from the thus obtained databases on the VTR, and thus, a search can be made at a comparatively high speed from a large amount of databases.

[Embodiment]

FIG. 1 shows an exemplary configuration of database information transmitted from an information center to a terminal via a broadcaster based on the present invention. 00 denotes a high order database, and 11 to mn denote low order databases. The high order database 00 contains a menu screen and additional information for selecting the low order databases 11 to mn. The additional information includes: link information for selecting a menu screen, and link information associated with the low order databases corresponding to selectors of the low order databases (sequential numbers of databases provided in order of downloading). The contents of the low order databases are image data having a tree configuration starting from one start screen for each low order database, and consist of screen information itself and information for linking with the screen information.

In the present invention, unique layer 5 protocols are

provided on the layers (hierarchies) 1 to 4 of the protocol shown in FIG. 4. Videotex protocols are employed with respect to layers 6 and 7. However, the layer 7 does not function between a broadcaster and a terminal, and only an interface between a database downloaded on a terminal and a user is ruled.

FIG. 2 shows an exemplary configuration of layer 5 in the present invention. One database is composed of one data group, and SOH denotes the head of the data group. The head of the database 00 is designated by a special code, wherein it is represented by SSOH. A data group header includes sequential numbers of identical data groups and a data group size as is in the case of the character multiplex broadcast. The present invention does not mention how other elements are determined.

FIG. 3 shows an exemplary configuration of a decoder part of a terminal for use in the present invention. A synchronous classification clock reproduction circuit 116, a waveform equalization circuit 117, a character signal demultiplexing circuit 118, and an error correction circuit 119 are provided instead of the modem 115 and its associated modem interface 114 included in the exemplary configuration of FIG. 7. Further, a large capacity buffer RAM 120, a VTR control circuit 121, a character signal multiplexing circuit 122, and VTR123 are added. Reference numerals 116 to 119 are substantially equivalent to a reception part of a decoder of the character multiple broadcast terminal. However, there is a difference in that a direct access is provided from the character signal demultiplexing circuit 118 to a memory bus. A buffer RAM is provided so as to acquire

two faces in a region of size including a maximum one of the databases shown in FIG. 1. An input and an output of the buffer RAM120 are provided while the CPU is interposed if no problem arises in a speed. If a high speed is required, a DMA (direct memory access) method is employed. However, this matter is a mere common sense as a technique of utilizing microprocessors, and thus, is not set forth in particular. In addition, in the character signal demultiplexing circuit 118, the head of a data block is inspected by means of pattern matching. There is provided a function for, If SSOH, SOH, ETX, and EOT are detected, notifying the fact to the CPU or DMA control circuit.

An operation of the present invention will be described with referring to FIGS. 1, 2 and 3. First, decoder mode specification is inputted using the keypad 106 of the decoder shown in FIG. 3, and the decoder is set to a reception mode. When data having a configuration as shown in FIG. 1 is transmitted in accordance of the protocols of the layers 1 to 4 shown in FIG. 4 and the layer 5 shown in FIG. 2 from a broadcaster, the data is received by means of a terminal's antenna, and a video image signal demodulated by means of demodulation circuit is inputted to an input terminal 131 of the decoder shown in FIG. 3. From the inputted video image signal, first, a synchronous signal is demultiplexed by means of a synchronous demultiplexing circuit 116, waveform equalization of video image signals are performed by means of a waveform equalization circuit 117 by using the synchronous signal, and a character signal is extracted by means of a character signal demultiplexing circuit 118. In

addition, in this circuit 118, after inspection of the head part of a data block is performed, if SSOH is detected, the fact is notified to the CPU101 or DMA control circuit. Then, by controlling the CPU101 or DMA control circuit, SSOH and subsequent character signals are read from a character signal demultiplexing circuit 118 to a buffer RAM120. When the character signal demultiplexing circuit 118 detects ETX, the fact is notified to the CPU101 or DMA control circuit, and the CPU101 or DMA control circuit stops reading of a character signal to the buffer RAM120. Then, after the character signal demultiplexing circuit 118 detects SOH, the following is repeated. That is, every time the fact is notified to the CPU101 or DMA control circuit, a face of the buffer RAM120 is switched to another one, a character signal is read, and the reading is stopped by detecting ETX. In the case where EOT is received, transfer to the buffer RAM120 is stopped and a terminal automatically enters a search mode. This procedure is repeated until a cancellation command from the CPU is issued by a mode change request from the keypad.

On the other hand, when detection of ETX and EOT is notified, the CPU101 instructs a VTR123 to start image recording via a VTR control part 121, and further, a character signal multiplexing circuit 122 is activated. The character signal multiplexing circuit 122 requests a data transfer to the CPU or DMA control circuit, whereby data transfer is performed from the read face of the buffer RAM 120, and, in the character signal multiplexing circuit 120, a synchronous signal of a TV signal

and data are multiplexed on each other, and the multiplexed data and signal are transmitted to the VTR123. At this time, the data is multiplexed during a video image signal period as well as a vertical return line period permitted for character multiplexing broadcasting. That is, if the size of one face of a database is 1 MB, an amount of data including a check code is about 2MB. Therefore, a broadcast reception time is about 34 seconds, and VTR image recording time is about 5 seconds. Thus, even if a commercially available VTR is employed, a loss time produced at the time of activation and deactivation can be sufficiently absorbed. The VTR initial setting system is provided as a system of writing an initial setting signal at the time of starting image recording and making a search at the time of reproduction. It is desirable to provide a system capable of directly making a search for an arbitrary image recording start point. However, in the case of a system of finding out a next image recording start point every time a search and activation are effected to establish a reproduction state, there is employed a system for the CPU to manage database image recording sequences, and then, issue a search request one after another until a target database is reached.

A database search starts from the user specifying a search mode using the keypad 106 via the remote controller photoreceptor part 105. If search mode specification is inputted from the keypad 106, the CPU101 specifies a search mode for the character signal demultiplexing circuit 118, and then, instructs the character signal demultiplexing circuit 118 to perform rewinding.

In the case where an access is provided to a new database, a rewinding instruction and a readout instruction is always supplied from the CPU101. When readout terminates, data contained in the database is inputted as a video image signal from the VTR123 to an input terminal 131 of this decoder. As is the case with a time of reception of a broadcast, although a character signal is demultiplexed, a character signal is sent to an error correction circuit 119, the character signal is error-corrected here, and the error-corrected signal is stored in the buffer RAM120. When data for one face of a database has been stored in the buffer RAM120, the CPU101 automatically makes a search for a start screen of the database. As is the case with FIG. 7, the screen data is decoded, and is sent out to a display. In the case where the terminal automat8ically enters a search mode at the end of reception of a database (EOT detection), advanced to this state, and one waits for the user search input. If the database is a first database, that is, a database 00, an expansion tree of such a database menu shown in FIG. 1 is situated under the start screen, and the target database numbers can be searched for by keypad input. If a system of downloading a database search program is employed, it is possible to make a conditional search for a database access structure, for example, instead of a tree search. After a target database number is found, when the found number is inputted using the keypad, the CPU101 instructs initial setting of a database of the number, and the target database is stored in the buffer RAM120. While an information search is made in the database, the buffer RAM120

is obtained as a database file. In the case where an access is provided to another database, a proper escape command is determined in advance, and the command is entered from the keypad 106, thereby reloading the high order database 00. In the case where the target data number is found, a command is prepared such that that database can be directly loaded. Such command setting and file control are common technique in the existing videotex system. The command setting and file control are not described here in particular.

If a database is cyclically updated at times, when a search is made, new and old items of data coexist, and there is a possibility that a search tree is not connected. In order to avoid such a problem, although a variety of methods can be proposed, for example, there are a method of, when one-round storage terminates, automatically establishing a search mode, and then, establishing a reception mode again in accordance with the user instruction, and a method of rewinding and overwriting VTR recording on a two-round basis, thereby making it possible to search one item while recording the other item. In the latter case, it is necessary to provide a proper gap between a first round and a second round so as not to destroy data contained in the second round by data contained in the first round, the data being image-recorded after rewound. In any case, no reception is possible while a search is made for, and thus, it would be proper to update information changing on one day by day basis at midnight or early in morning, for example, by providing the information changed to time within a short time.

It is possible to independently use the VTR used for the terminal of the present invention as an essential VTR as required. In addition, instead of the VTR, if a hard disk is employed, a database can be changed to another at a high speed, and however, the terminal price becomes high.

[Advantages of the Invention]

As described above, by employing a download type videotex system of the present invention, a large amount of data can be downloaded without employing a communication line. Moreover, the existing VTR can be used as a large capacity file. In addition, in a series of information searches, a RAM is employed as a data file. Thus, there is an advantage that videotex service capable of making a search at a high speed with a low communication cost can be provided by slightly larger initial investment than that of a character multiplexing broadcast from the user.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 is a view showing an exemplary configuration of a database in a download type videotex system according to the present invention,

FIG. 2 is a view showing an exemplary configuration of a layer 5 in accordance with protocols in the present invention,

FIG. 3 is a block diagram showing an exemplary configuration of a terminal in the present invention,

FIG. 4 is a view showing a technical standard for a protocol in a character multiplexing broadcast system,

FIG. 5 is a view showing one exemplary configuration of

a videotex system,

FIG. 6 is a view showing another exemplary configuration of a videotex system,

FIG. 7 is a block diagram showing an exemplary configuration of a conventional videotex terminal.

FIG. 1

High order database

Primary menu

Secondary menu

11 Low order database

m1 Low order database

1n Low order database

mn Low order database

FIG. 2

Database 00

Database 11

Database mn

Data group header

Link information

Screen information

Data group header

Link information

Screen information

Data group header

Link information screen information

FIG. 3

Channel selection demodulation circuit

131 Video image signal

117 Waveform equalization circuit

116 Synchronous demultiplexing circuit

118 Character signal demultiplexing circuit

104 Character font ROM

119 Error correction circuit

105 Remote controller photoreceptor part

120 Buffer RAM

107 For image memory photographing

108 For image memory character

111 Hard copy interface (IF)

Hard copy device

112 Melody interface (IF)

Melody generation device

113 Horizontal and vertical timing generation circuit

121 VTR control circuit

122 Character signal multiplexing circuit

109 Display control

110 Digital-analog conversion

TV receiving equipment

FIG. 4

Layer 7 "Application": Operation and utilization of a variety of character multiple broadcast services

Layer 6 "Presentation": Encoding of presented information based on B-unit basic coding system and transparent mode coding system

Layer 5 "Session"

Program management data

Page data

Page data

Program data header

Data unit (0, 1 or a plurality)

Page data header (PACI)

Data unit PB1 to PBn (0, 1 or a plurality)

Data unit header (PACI)

Data unit (0, 1,or a plurality)

Data group header

Data group header

Data group header

Data group header

Data group 0

Data group 1

Data group 2

Layer 4 "Transport"

Data block

Data group

Layer 3 "Network"

Data block B11 to BD22 (176 bits)

Check code

Prefix (14 bits)

Synchronization part

Data packet (272 bits)

Layer 2 "Link"

(190 bits)

Check code (82 bits)

Framing code (8 bits)

Block line (16 bits)

Layer 1 "Physical" (transmission path)

* Layer 1 is handled in CCIR.

Data line B1 to B27 (296 bits)

Character signal

FIG. 5

Telephone network

Terminal

Information center

FIG. 6

Information center

Telephone network

FIG. 7

IF: Interface

115 Modem

Downward 4.8 kb/s

Upward 75 b/s

104 Character font ROM

114 Modem interface (IF)

106 Keypad

105 Remote controller photoreceptor part

107 For image memory photographing

108 For image memory character

109 Display control

110 Digital-analog conversion

TV reception equipment

111 hard copy interface (IF)

Hard copy device

112 Melody interface (IF)

Melody generation device

113 Horizontal and vertical timing generation circuit